



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/821,589

04/09/2004

Yosuke Hosoya

09792909-5854

1893

26263 7590 05/22/2007  
SONNENSCHN NATH & ROSENTHAL LLP  
P.O. BOX 061080  
WACKER DRIVE STATION, SEARS TOWER  
CHICAGO, IL 60606-1080

EXAMINER

CANTELMO, GREGG

ART UNIT

PAPER NUMBER

1745

MAIL DATE

DELIVERY MODE

05/22/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



**DETAILED ACTION**

***Response to Amendment***

1. In response to the amendment received March 16, 2007:
  - a. Claims 1-5 are pending;
  - b. The 112 rejections are withdrawn in light of the amendment;
  - c. The previous rejections are withdrawn in light of the amendment.

***Information Disclosure Statement***

2. The information disclosure statement filed March 16, 2007 has been placed in the application file and the information referred to therein has been considered as to the merits. JP 08-022219, drawn to an image forming device, has not been considered since the relevance of this reference to the claimed and disclosed invention is not clear.

***Claim Rejections - 35 USC § 112***

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.
4. Claims 1-5 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The

Art Unit: 1745

claims do not have full support for the species of  $\text{LiAlO}_x$  and this claimed species is not held to be coextensive with the disclosed  $\text{LiAlO}_2$  and thus introduces new matter into the application. If Applicant wishes to maintain the lithium aluminum

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The composition of  $\text{LiAlO}_x$  is indefinite since it fails to define x. Thus is it unclear as to whether or not oxygen need be present in the claimed composition (since x could be defined as 0) or if oxygen is present it is additionally unclear as to what range of oxygen is present in the composition.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Application Publication No. 2002/0127473 (Ooya).

Ooya discloses a nonaqueous secondary battery comprising a negative active material, positive active material and electrolyte between the active

Art Unit: 1745

materials wherein the positive active material comprising: particles comprising a compound oxide of lithium and a transition metal (paragraphs 23-31), wherein, the compound oxide, of lithium has a layered structure with a coating layer comprising an inorganic compound and a carbonaceous material formed on at least part of each surface of the particles (abstract), and the inorganic compound comprises a compound oxide of at least one selected from the group of  $\text{LiFePO}_4$ ,  $\text{Li}_3\text{PO}_4$ ,  $\text{LiAlO}_x$ ,  $\text{Li}_4\text{TisO}_2$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{TiO}_2$  and  $\text{MgO}$  (paragraph 34 and Table 1 as applied to claims 1 and 5). Notably Example 21 teaches of a coating mixture comprising both carbon black and alumina.

***Claim Rejections - 35 USC § 102/103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that

Art Unit: 1745

the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 3 and 4 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ooya.

The teachings of Ooya have been discussed above and incorporated herein.

As to the ratio of inorganic material to carbonaceous material (claim 3):

Ooya teaches of using inorganic oxides, carbon and mixtures of these materials as a coating placed upon a positive active material comprising particles comprising a compound oxide of lithium and a transition metal as discussed above.

In the examples of Table 1, the coatings in the inventive examples of Ooya are either to an oxide coating (Examples 1-19) or a mixture of an oxide coating and carbon (Examples 20 and 21). Example 21 particularly shows a core particle of  $\text{LiNiO}_2$  having a shell of  $\text{Al}_2\text{O}_3$  and Carbon black.

While Ooya does not explicitly disclose the ratio of alumina to carbon black in this example, Ooya does teach that the mass of the oxide is in a range from 0.001-2% (paragraph 40) and of a carbon presence in a range from 0.001 to

Art Unit: 1745

10% (paragraph 41). At least a portion of these ranges overlap the claimed range of claim 3 and various obvious ratios, such as a 1:1 ratio of each material falls in the scope of both the prior art and claimed product and would have been obvious to one of ordinary skill in the art. Furthermore varying the relationship of these two compositions relative to one another is a result effective variable whereby an increase in the carbon relative to the oxide would have improved the electrical conductivity of the coating (and vice versa). Lastly even if there are any differences between the complete disclosed coating and that of claim 3, the differences to at least the portions of the ranges which overlap one another or else are shown to be close to one another would have been slight differences and in the absence of clear evidence of criticality would have been obvious to one of ordinary skill in the art. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

As to claim 4:

Ooya teaches of using inorganic oxides, carbon and mixtures of these materials as a coating placed upon a positive active material comprising particles comprising a compound oxide of lithium and a transition metal as discussed above.

In the examples of Table 1, the coatings in the inventive examples of Ooya are either to an oxide coating (Examples 1-19) or a mixture of an oxide coating and carbon (Examples 20 and 21). Example 21 particularly shows a core particle of  $\text{LiNiO}_2$  having a shell of  $\text{Al}_2\text{O}_3$  and Carbon black.

While Ooya does not explicitly disclose the ratio of alumina to carbon black in this example, Ooya does teach that the mass of the oxide is in a range from 0.001-2% (paragraph 40) and of a carbon presence in a range from 0.001 to 10% (paragraph 41). Each value is relative to the mass of the active material. And the combination would have at least reasonably encompassed the claimed ration of 98% active material to 2% coating based on the upper values of each of the oxide and carbon materials.

Thus at least a portion of these ranges overlap the claimed range of claim 4. Furthermore varying the relationship of these two compositions relative to one another is a result effective variable whereby an increase the coating would have improved flowability of the active material while reducing the active portion of the particles and conversely reducing the coating below 2% would have improved the active nature of the particles while reducing the flowability of the particles. Lastly even if there are any differences between the complete disclosed coating and that of claim 4, the differences to at least the portions of the ranges which



Art Unit: 1745

overlap one another or else are shown to be close to one another would have been slight differences and in the absence of clear evidence of criticality would have been obvious to one of ordinary skill in the art. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969). It has been held that when the difference between a claimed invention and the prior art is the range or value of a particular variable, then a prima facie rejection is properly established when the difference in the range or value is minor. Titanium Metals Corp. of Am. v. Banner, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

### ***Claim Rejections - 35 USC § 103***

9. Claim 2 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ooya in view of U.S. Patent Application Publication No. 2002/0141937 (Howard).

The teachings of Ooya have been discussed above and incorporated herein.

Ooya does not teach of the inorganic oxide being a lithium compound.

Note that claim 2 is held to limit to those materials in claim 1 which positively have lithium therein.

Ooya discloses using non-lithiated metal oxide materials in combination with carbon materials for the shell coating. In some instances these coatings include  $\text{Al}_2\text{O}_3$ , such as that shown in Example 21.

$\text{Al}_2\text{O}_3$  shell coatings are known to provide various benefits including those taught by Ooya as well as suppress deterioration of the active particles by preventing direct contact between the active material and electrolyte, preventing side reactions between the electrolyte and remaining alkali in the active material and provide improved cycling of the active material.

Use of both  $\text{LiAl}_2\text{O}_3$  and  $\text{Al}_2\text{O}_3$  as shell coating for positive electrode materials are known in the art as shown by Howard (paragraphs 21 and 22). Both lithiated metal oxides and non-lithiated metal oxides are recognized therein as suitable shell coating for the positive electrode active material and provide acid resistance, discharge capacity and stability.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Ooya by replacing alumina with lithiated alumina since it would have been an equivalent alternative metal oxide shell coating for a positive electrode active material which would have imparted those properties required in Ooya and also would have provided enhanced acid resistance, maximum discharge capacity and improved stability. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

Art Unit: 1745

***Response to Arguments***

10. Applicant's arguments with respect to claims 1-5 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is 571-272-1283. The examiner can normally be reached on Monday to Thursday, 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax

Art Unit: 1745

phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
gc  
May 17, 2007

Gregg Cantelmo  
Primary Examiner  
Art Unit 1745